DOCUMENT RESUME

ED 338 658 TM 017 437

AUTHOR Dunn, Rita; And Others
TITLE Mobility: A Frequently Misinterpreted Learning Style Characteristic of Underachievers (3-12).
INSTITUTION National Association of Secondary School Principals, Reston, Va.; Saint John's Univ., Jamaica, N.Y.
PUB DATE Aug 83
NOTE 29p.; A product of the Center for the Study of Learning and Teaching Styles.
PUB TYPE Information Analyses (070)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Academic Achievement; *Behavior Patterns; Classroom Research; *Cognitive Style; Comparative Analysis; Grade 7; Junior High Schools; *Junior High School Students; Literature Reviews; *Low Achievement; *Mobility; Personality Traits; Student Attitudes; *Underachievement; Word Recognition
IDENTIFIERS Active Learning; *Learning Style Inventory; Passivity

ABSTRACT

Educators, environmentalists, and psychologists generally agree on the need to incorporate opportunities for movement by students into the classroom, but an extensive review of the literature did not reveal any studies concerned primarily with the relationships among students' mobility, their learning style preferences, and their academic achievement. To investigate these relationships, an initial screening with the Learning Style Inventory of R. Dunn and others (1979) of 417 seventh-graders in a classroom in New York State resulted in identification of 217 students with a preference for mobility while learning and 89 with a preference for passivity. The remaining 111 students did not believe that they were affected by mobility needs. Twenty students at each end of the mobility spectrum participated in the study. Word-pair recognition tasks were developed for the passive and mobile environments, and all students were taught in both conditions using a 2 X 2 repeated measures design. "Active" and "passive" students performed equally well in the passive environment, but those with a preference for mobility had the highest scores of all groups when they were permitted movement while learning. The implications for instruction and the possibility that educators have often misinterpreted student mobility needs are considered. There are 50 references. (SLD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

August 1983

Learning Styles Network
The Center for the Study of Learning and Teaching Styles

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
✓ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
RITA DUNN
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

ED338658

Mobility: A Frequently Misinterpreted Learning Style Characteristic Of Underachievers (3-12)

Rita Dunn and Joan Della Valle

with

Gene Geisert, Richard Sinatra and Robert Zenhausern

RITA DUNN is professor, Center for the Study of Learning and Teaching Styles, St. John's University, New York.

JOAN DELLA VALLE is education administrator, District #29, New York City Board of Education.

GENE GEISERT is associate professor, Division of Administrative and Instructional Leadership, St. John's University, New York.

RICHARD SINATRA is director of reading programs, St. John's University, New York.

ROBERT ZENHAUSERN is professor, Department of Psychology, St. John's University, New York.

TM017437

School of Education and Human Services, St. John's University
Grand Central and Utopia Parkways, Jamaica, New York 11439

Co-sponsored by the National Association of Secondary School Principals and St. John's University

BEST COPY AVAILABLE

Learning Styles Network
The Center for the Study of Learning and Teaching Styles

Mobility: A Frequently Misinterpreted Learning Style Characteristic Of Underachievers (3-12)

Rita Dunn and Joan Della Valle
with
Gene Geisert, Richard Sinatra and Robert Zenhausern

In 1967, when the New York State Education Department requested that participants in an experimental teacher education program focus on approaches through which underachieving youngsters might increase their reading and mathematics achievement (Dunn & Shockley, 1970, 1971), those school-based adults immediately recognized that such youngsters appeared to exist in a state of virtually consistent motion. Their teachers repeatedly admonished them to sit still, be quiet, sit up straight, put their feet onto the floor, stay in their own seats, and pay attention--but to little avail; within moments of such reprimands those students returned to their finger tapping, feet shuffling, slouching, sitting-on-legs, leaning-on-hands, and moving from one section of the seat to another. Apparently nothing could keep such children from exhibiting what appeared to be restless, fidgety, and hyperactive behaviors; in fact, it seemed that the longer they were required to sit, the more nervous they appeared to be. We questioned many medical experts about the youngsters'

School of Education and Human Services, St. John's University
Grand Central and Utopia Parkways, Jamaica, New York 11439
Co-sponsored by the National Association of Secondary School Principals and St. John's University

apparent need to be in almost constant motion and, at the time, received a variety of different opinions which included that the children were: (a) poorly disciplined; (b) not ready for school; (c) undernourished and, therefore, unable to relax sufficiently to concentrate; (d) normal - and that a great deal of movement was a sign of a healthy, active child; (e) not being taught in an interesting manner and, therefore, were bored; (f) responding to the abnormal restrictions of traditional schooling; that people learn through active - rather than passive - involvement; (g) reacting to a lack of personal involvement; that large group lessons and assignments were not motivating them and that their behaviors were reflecting a combination of their disinterest, our poor teaching, the school's repressive physical requirements of children, and a general apathy toward the subject oriented instructional methods being employed. Despite the disagreement among physicians concerning the cause of the continuous movement among school-aged children, they did evidence a concensus that the need for mobility was "a conglomerate function of one's physical, emotional, and environmental reactions" (Dunn & Dunn, 1978, p. 17). Additionally, they contended that "most students cannot easily control their need to move while learning" (p. 17) and that, to a great degree, it was biologically imposed. Almost sixteen years later, Schmeck & Lockhart (1983) reported that inherited differences in the ways in which people's nervous systems function require that some learn in a stimulating environment while others must have quiet, calm, and few distractions.

One month later, Thies corroborated his earlier report (1979) and verified that learning style is less a learned function and more an outgrowth of the organization of the nervous system (1983). He specifically stated that thought processing is genetically imposed and must be responded to since students cannot alter their styles; only time, maturation, and biology can foster such change.

Because we were consciously endeavoring to identify effective ways of teaching underachievers, and because they did not appear able/willing to remain passive in the instructional environment long enough so that we could teach them through our standard methods, we began to experiment with a number of different approaches.

We reasoned that, if they could not/would not remain passively seated for any appreciable length of time, we would reward them with opportunities for mobility if they completed their assignments. We designed many short academic tasks that taught a specific skill and matched each with either written directions, a book, a tape, a filmstrip, and/or a game so that students could learn in the ways each wished. The tasks and their accompanying resources were distributed among several instructional areas (Interest Centers, Learning Stations, Media Corners, Little Theaters, lounge areas, and so forth) within the classroom (Dunn & Dunn, 1978). Students were permitted to begin the first task at one station and, when completed correctly and checked by either the teacher or a self-correcting Answer Key, they were instructed to move to the next task situated at another station and to continue that routine until the entire session's requirements had been completed.

At several points in the sequence, the children were tested to be certain that they actually were learning rather than merely completing assignments without internalization.

Because the teachers were no longer involved in direct, large group instruction, they were not irritated by the students' walking, whispering, informal seating arrangements, and frequent mobility; in fact, they rarely commented on excessive movement. What they did notice was that, in most cases, the underachievers paid better attention to their tasks, learned more, retained it better, and behaved better than they had previously. Conversely, many of their former excellent students evidenced irritation at the need to move from one instructional station to the next to complete the series of tasks assigned for a morning or a period. Several questioned whether they could do all their work at their own desks; others said they were tired of having to go from one place to another; many evidenced annoyance at having to work at large tables with classmates moving about. Apparently the scheme to provide mobility opportunities for underachievers was effective for many - but not all - of that group, but was detrimental to many achieving youngsters. The latter group did not necessarily evidence lower achievement, but we witnessed daily episodes that revealed personal anxiety and discomfort as an outgrowth of the required mobility.

We discussed the problem openly with students in grades 3-8; those youngsters often could describe the environment that each wanted/needed to feel relaxed and to learn. We then developed a series of questions that later was expanded into our first Learning

Style Questionnaire (Dunn & Dunn, 1972). By 1975, a set of fifteen questions were related directly to assessing the amount of mobility required of students while learning (Dunn & Dunn, 1975, 1977). Eventually, eighteen sets of questions were tested, submitted to both factor analysis and jury validation, and combined into The Learning Style Inventory (LSI) (Dunn, Dunn, & Price, 1983) which was revised four different times - 1974, 1978, 1979, 1983.

Keefe reported that the LSI "is the most widely used assessment instrument in elementary and secondary schools" (1982, p. 52). Analysis of the data elicited from more than 300,000 students in grades 3-12 across the United States revealed that virtually 50% often require mobility while engaged in concentrating, thinking, and studying. Examination of the data gleaned from the Productivity Environmental Preference Survey (PEPS) (Dunn, Dunn & Price, 1979) - an adult learning style test, corroborated that, of the adults tested - and that group was comprised essentially of classroom teachers and administrators - at least one fourth also required mobility while learning. Inquiries substantiated that the PEPS accurately identified teachers who interrupted their work frequently to get a cup of coffee, to smoke, to make a phone call, and to use the lavatory; it is possible that those behaviors merely were manifestations of their need for mobility. PEPS scores also accurately identified the administrator who was rarely in his office as well as the one who usually was there; those profiles usually reflected their need for either mobility or passivity, although at times, other learning style characteristics intervened.

Our initial interest in the mobility needs of underachievers led to a review of the literature to determine whether other researchers had investigated this particular element.

The Research Interpreting Mobility as Hyperactivity

Initially, the labeling of students as being excessively hyperactive appeared to be skewed sexually. Fadely and Hosler (1979) noted that most children referred to their clinic for hyperactivity were "almost always boys" (p. 219). Additionally, Restak (1979) reported that "over 95% of hyperactives are males" (p. 230). Restak also verified that the current research involved with sexual differences in brain functioning supported those statistics because "the male brain learns by manipulating its environment" (p. 230). Furthermore, his studies of personality variables revealed that intellectual achievement had been categorized with different criteria for boys and girs. Low-level activity, lack of aggression, anxiety, and timidity were correlated with intellectual achievement in boys, whereas the correlates for girls were high activity, competitiveness, independence, and a lack of fear or anxiety. The inherent conflict in the need for males to inhibit activity and overt behavior while simultaneously achieving at a high academic level, was confirmed further by Fadley and Hosler (1979) when they stated: "In most cases there was encouragement of the typical boy aggressiveness on one hand and a subsequent rejection of the child for displaying such behavior." (p. 219) Thus, additional support has been provided for the inclusion of Mobility as a learning style characteristic and for the need to address

this element in the classroom. Restak clearly stipulated that the current design of most classroom environments did not provide the male student with sufficient outlets for expression of that need:

> The male brain learns by manipulating its environment, yet the typical student is forced to sit still for long hours in a classroom. The male brain is primarily visual while classroom instruction demands attentive listening. Boys are clumsy in fine-hand coordination, yet are forced at an early age to express themselves in writing. Finally, there is little opportunity in most schools, other than during recess periods, for gross motor movements or rapid responses. In essence, the classroom in most of our nation's primary grades are (sic) geared to skills that come naturally to girls but develop very slowly in boys. The results shouldn't be surprising; a 'learning disabled' child who is also frequently 'hyperactive.' (p. 230)

Tingley-Michaelis (1983), specializing in educational development at Illinois State University, concurred with Restak on the inherent need of many <u>to move while learning</u>, but did not categorize that requirement by gender. Her report suggested that, although children do move more than most adults, many educators believe that such activity, in some way, precludes the child's ability to focus on what is being learned. She affirmed that youngsters labled as hyperactive in school often are extremely fidgety because their teachers are providing experiences for them "to think about something" when the child really needs "to do something" instead (p. 26). Incidentally, comparisons of both LSI and PEPS data verify that <u>some</u> adults are more in need of continual mobility than some youngsters. It is true, however, that more children than adults appear to require

frequent opportunities for activity-based experiences while engaged in learning.

Just as the faculty of that New York State Education Department Teacher Education Program had concluded in 1967, Tingley-Michaelis suggested that a need existed to create instructional centers in every classroom to allow for movement in an orderly fashion. She did not imply that every class member should be permitted to meander but, rather, she delineated the need for organized movement in specific areas for required, designated purposes. She also stressed that:

> each of the centers have (sic) been carefully designed so it will help develop skills to replace problems listed. Many of the problems that teachers see as behavior problems, therapists see as ineffective patterns. (p. 26)

Reinert (1976) recognized the importance of movement in the learning process when he included it as one of the four categories distinguishing among specific information-receiving preferences. He developed a profile that consisted of the following four modes: (a) Visualization; (b) the Written Word; (c) Listening; and (d) Activity. Each of those classifications was measured by raw scores on a self-report inventory and were analyzed by placing those scores into appropriate stanines, which he termed bands. Scores at either the negative or positive extreme bands indicated a dominant influence of that factor. For Activity, Reinert concluded:

> This category represents the relative importance of some manner of physical activity to the learning process. A person scoring above the median band in this category will find it a definite advantage to become physically active in some way

> in order to facilitate learning. Such activities can be as simple as taking notes or writing out exercises, and one participant--while denying that this interpretation applied to her--said that when she needed to memorize something, she always paced the floor. Persons scoring fairly high in this category are usually compulsive note takers in class or at lectures (and even films), but they will seldom need to refer to their notes at a later time, for the activity of writing seems to impress the information on their memory. (p. 166)

It is possible that the compulsion to engage in some form of physical activity has been interpreted by pedagogues as either inattentiveness or hyperactivity, confirming both Tingley-Michaelis's and Restak's investigations of that phenomenon. Reinert's instrument, the Edmonds Learning Style Identification Exercise (ELSIE), was designed to provide practical suggestions for the classroom teacher once students' preferences had been confirmed. Its benefit was two-fold in that it assessed unique characteristics and clearly distinguished those children from others with clinical dysfunctions.

During that same period, Nixon (1966) examined the possibility of changing hyperactive student behaviors in the classroom by re-directing those patterns to a more task-oriented situation. Twenty-four subjects in grades one through four were selected to participate in an experimental design that tested students' abilities to recognize the differences between hyperactive and task-oriented behavior. Subjects received positive reinforcement, both materially and verbally, upon identifying appropriate behavior correctly. The results of that study indicated that no significant changes in the direction of higher task orientation were exhibited by an of the groups; behavior modifi-

cation was not considered successful. Despite that data, ten years later Anderson (1976) reported the results of a series of studies that spanned the previous decade. The cululative effect of those findings suggested that immediate feedback to students when they were not attending to the task, provided sufficient reinforcement to decrease their motor restlessness and inattention.

Other investigators also examined modes of feedback treatment. Mitchell and Crowell (1973) utilized a reinforcement technique on nine-year-old subjects; according to them, the youngsters' undesirable behavicrs disappeared when positive reinforcement followed on-task behavior.

Three years later, Shecket and Shecket (1976) examined elementary school children categorized as hyperactive by their teachers to determine whether behavioral intervention techniques were suitable as a replacement for drug therapy. Those researchers concluded that a feedback program was a suitable alternative to changing inappropriate behaviors. That same year, Severnson (1976) also suggested the use of systematic relaxation and biofeedback to alleviate selected classroom problems. Sherman and Anderson (1980) further researched biofeedback training and reported that significant changes were evidenced and that the modified behavior was maintained without continuous material reinforcements.

That type of non-drug therapy was investigated later by Omizo (1980, 1981) in two separate studies. He examined the effects of relaxation training and biofeedback on five factors of self-concept

among hyperactive male students. The findings of that research confirmed that that type of non-drug treatment was successful and suggested that biofeedback and relaxation training be included in the general curriculum. The following year, Omizo examined the effect of those treatments on Locus of Control and the activity levels of hyperactive boys. Significant differences in the reduction of excessive movement between the control and the treatment groups were noted.

In 1977, Koester and Farley studied 98 elementary school children who were divided equally between six open and traditional classrooms. The results of that research demonstrated that behavioral problems, such as hyperactivity, were identified more readily in a traditional, rather than in an open, setting where a wider range of behaviors was acceptable. That conclusion verified the interpretive bases on which hyperactivity had been identified and defined. It further corroborated Bawkin and Bawkin's (1966) categorization of hyperactivity to include clinical and developmental aspects.

Sociological factors also were examined as they related to hyperactivity. In 1972, Clarkson and Hayden initiated an investigation into the relationships among the family, neurological status, and hyperactivity. That research uncovered only few pathological reasons for disturbing behavior patterns, but suggested that environmental factors were relevant and contributory--implying the ability to manipulate that variable.

Anderson (1977) investigated hyperactive behavior of White, Black, and Mexican-American students. In addition to noting that

teachers assessed hyperkinetic children accurately, he reported that (a) social learning affected behavior patterns and (b) ethnic background influenced the inhibition or expression of overt behavior.

As early as 1974, Clark recognized that patterns of disruptive behavior in school emerged annually, often at predictable intervals. Specifically, he noted that pre-holiday periods seemed to correlate with restless, furtive, hyperactivity. He suggested reprogramming schools to include curriculum and opportunities that accommodated students' restlessness. Shulman (1975) also proposed designing activities and lessons that incorporated physical activity to respond to such needs in students and to provide informative and creative outlets. Both authors categorized those behaviors as variables to be accommodated rather than deviant traits.

Fadley and Hosler (1979) recognized that the term hyperactivity was used to define a wide range of behaviors that included higher-than-average activity levels, short attention spans, impulsiveness, poor behavioral organization,and distractibility—all usually associated with neurological disorders. However, those researchers astutely realized that:

> There appears to be a difference between the clinical manifestations of hyperactivity and the use of the word to label overly active children in the public school. The present popular use of the term has reached levels where any child who does not attend well in school is labeled carelessly by teachers and parents as hyperactive. This often results in attempts to gain medication relief for the child and teacher for a disorder which may or may not involve actual neurological

> difficulties. This sort of practice can lead to a lack of understanding of the many causes of distractibility, which can include the teacher's own difficulties in instructional techniques or the parent's intolerance of particular child behaviors. (p. 201)

Those researchers recognized that many children had difficulty conforming to various gradations of structure within school settings and, thus, examined the personality characteristics of such youngsters and their relationships to hemisphericity. Subsequently, they termed the right brain dominant student as the alpha or natural child, stating that:

> The natural child with his tendency to engage in nonverbal organization and his difficulty with language . . . often appears distractable, overly active and impulsive. He tends to have difficulty with temporal organization due to his fixation on 'now' oriented behaviors which often involve movement and activities. Those behaviors, however are as natural for him as the well organized and sequential behaviors of the left minded or socialized child . . . His lack of organization is simply not consonant with the goals of the school, and he therefore appears hyperactive by criteria of the school. (p. 202)

In addition, they stated that the alpha child's lack of ability to work in a restrictive and structured environment is extremely noticeable in a traditional school setting; they thus confirmed Koester and Farley's (1977) findings. Fadley and Hosler also verified that when alpha children were placed into an open school situation, they were less likely to be identified by the teacher as hyperactive. In an open setting, freedom of movement is encouraged and children have many opportunities in which to interact. The findings of those

researchers emerged concurrently with Restak's investigations of the functions of the human brain. Both reported the mislabeling of hyperactive children and the personality variables associated with the need for movement.

While proponents of learning style examined individual preferences for particular environmental conditions, other researchers investigated the structure of classrooms to determine their environmental effects on learners (Fitt, 1975; Getzels, 1975; Holt, 1975; King & Marans, 1979; Mehrabian, 1976; Prochansky & Wolfe, 1975; Propst, 1975; Sommer, 1969, 1974; Sommer & Becker, 1975).

Getzels (1975) noted that:

> The central fact in the growth and development of children is not hunger satisfaction or thirst satisfaction or some other so-called primary drive satisfaction but the opportunity for effective interaction with the environment, as manifested in the child's curiosity and exploratory activity. (p. 9)

However, despite that description of the central requisite for child growth and development, Sommer and Becker (1975) described the typical classroom as the antithesis of that requirement.

> The American classroom is characterized by fixed time-space coordinates with implicit, as well as explicit behavioral norms. A student is expected to remain seated in a specified location for a designated number of minutes. Straight rows tell him to look ahead and ignore everyone except the teacher, who, with back to students, writes important messages on the blackboard. (p. 75)

Sommer's (1969) earlier writings hypothesized that restricted mobility within a classroom was detrimental to many learners. "The teacher has 50 times more free space than the students, with mobility

to move about" (p. 99). However, for students, "movement in and out of classrooms and the school building itself is rigidly controlled" (p. 99), giving the teacher a clear picture of what is happening but presenting a cluttered world to the student. Additionally, Sommer (1969) posited that shy students would be more restricted in such an environment and less apt to ask for assistance. Furthermore, Sommer emphasized that "the distraction of the classroom situation in which students are denied mobility and control of their working spaces must be considered" (p. 112).

The need to interact and move about within one's environment was examined by many theorists, including Getzels (1975), who reported experiments designed to test that need. In one such study, subjects were made to feel comfortable, were fed, and were paid to remain in an inactive environment. After several days he reported that:

> The situation became so unbearable that it was impossible to keep the subjects in the experiment for more than two or three days despite the satisfaction of all their bodily needs and the pay for presumably doing nothing. On leaving they reported feelings of intellectual disorganization, nausea and fatigue. In short, normal, intellectual adaptive behavior requires sensory input to cope with. (p. 10)

Similarly, Prochansky and Wolfe (1975) examined the degree to which the design of the classroom accommodated student mobility. They stated that the physical arrangement of the classroom must be reevaluated constantly by the students and the teacher as the needs of the groups change. Those authors stipulated that, as the teacher

relinquished more space to the students, children assumed more control of their activities and of themselves. Prochansky and Wolfe correlated the degree of movement and space in the classroom with self-determination. In addition, those researchers emphasized that crowding in an area produced "restless and fidgety" (p. 44) students; therefore, movement and changes were encouraged:

> Moving furniture is usually seen as a disrupting, chaotic activity which is useless except for its end result, open space. But if we view the activity in its proper perspective as another way for children to function independently and with a sense of responsibility, the time and effort become an investment in learning. (p. 45)

Additionally, they noted that movement activities stressed creative abilities as well as "giving expression to the child's inner needs" (p. 45).

Sommer and Becker (1975) termed the American classroom "a teaching environment designed for a 'sit and learn' educational philosophy" (p. 76). Furthermore, they stated that "The effectiveness of this method in motivating students to learn more about their environment (and return information) is being questioned by increasing numbers of educational critics" (p. 76). To verify that, they compared four college programs in varied academic settings with traditional classroom instruction. Examination of the groups revealed that those who participated in field study programs evidenced that "you experience things not just on a cognitive level but with whole bodies and emotions" (p. 79). Additionally, they reported that "experience in these settings meant that action was

possible and learning was discovery" (p. 78). Those investigators provided further reinforcement for the reduction of static learning environments.

Propst (1975) provided additional support for the need to manipulate and move within one's environment. He stated that while most people have been:

> conditioned to the reverse—do not touch! do not use! A lively manipulation of the work environment can support the uniqueness and va iety of both the individual worker and the task he performs. (p. 86)

Other environmental specialists correlated movement with individual stimulation and growth. Curtis and Smith (1975) and Mehrabian (1976) agreed the need existed to provide a school environment that stimulated the learning process through increased activity. Mehrabian succinctly stated:

> Furniture arrangement and the various activity centers in a classroom should encourage children to move about . . . and in general to provide them with a greater variety of physical activity and stimulation in the classroom. (pp. 158-159)

Fitt (1975), a movement educator, recognized that children bring their own sense of space and motion to an environment. She posited that changes in the organization of the surroundings affected social interaction but the child's individual style governed his "interaction with and within the environment" (p. 94). Describing an experiment in an open environment she noted that:

> Many of the children in the team moved freely from one room to another for a variety of reasons. However, some children stayed almost exclusively in one of the two rooms, despite

> teacher's attempts to get them to try the other room. No amount of coaxing or suggestion could seem to increase these children's interest in moving to the other room. These are cases of a child's style . . . governing his interaction with and within the environment. (p. 94)

Fitt recognized that if the environment has marked and specific affects on students, then it is important to determine exactly what those affects are among differing learning, social, and movement styles. She suggested the necessity of correlating individual styles of movement with the environment.

Four years prior, Kephart (1971) had noted that all activities involved some form of movement. He postulated that, while gross motor behaviors were observed easily, non-overt activities, although equally dependent on muscular activity, were less apparent. Specifically, he stated that:

> General muscle tension in non-overt activities can be seen by observable tensing of the postural mechanism, by occasional drumming with the finger or pacing across the floor . . . . Thus it is logical to suppose that even in 'pure thought' activities the musculature basis of behavior is not lost but still provides the foundation for these higher activities. (p. 81)

Kephart further contended that the efficiency of the thought process was only as strong as the motor abilities upon which they were based. Kephart's physiological theories provided an additional foundation for the inclusion of movement as a learning style element. He was supported conceptually by Reinert (1976) who described the need to pace or tap one's finger while engaged in mentally taxing activities.

Investigations into the phenomenon of test anxiety revealed

several correlations among mobility, gender, and stress. In 1973, Mandelson examined the effect of anxiety on gender. Her research demonstrated that high levels of anxiety facilitated female performance but hampered that of males. Several years later, Wine (1979) reported that anticipation of either an evaluation or an examination led to a reduction in the activity level of many students' immobility and was related to anxiety. Furthermore, research verified that as anxiety increased, ability and performance levels often decreased (Gjesme, 1982; Hill & Eaton, 1977). Additionally, Phillips (1968a, b) confirmed that behavior problems surfaced with higher anxiety levels.

The element of Mobility has been described by educators, researched by environmentalists, and examined by psychologists; all agreed upon the inherent need to incorporate extended opportunities for more extensive movement into the classroom. However, an exhaustive review of the literature failed to reveal any studies which were concerned primarily with the relationships between students' mobility, their learning style preferences, and their resultant academic achievement. Thus, because of the many relationships that appear to exist, it was essential to investigate that element directly.

The First Experimental Study Involving Identified Learning Style Preferences for Mobility and Academic Achievement

As indicated in this review of the literature, the need for mobility among school-aged youngsters was viewed as a negative characteristic for decades and often was referred to as hyperactivity.

It only has been during the past few years that selected investigators asserted that mobility needs are biologically derived (Fadely & Hosler, 1983; Restak, 1979; Schmeck & Lockhart, 1983; Thies, 1983) and that the conventional classroom environment and instructional strategies that consistently inhibit movement negatively affect normally healthy children (Fitt, 1975; Getzels, 1975; Kephart, 1971; Mehrabian, 1976; Prochansky & Wolfe, 1975; Sommers, 1969; Sommer & Becker, 1975). Thus, in view of the increased academic achievement by students whose other learning style preferences had been matched with selected treatments (Krimsky, 1982; Lynch, 1981; Pizzo, 1981; Shea, 1983; Tannenbaum, 1982; Urbschat, 1977; Virotsko, 1983; Weinberg, 1983; Wheeler, 1983), Della Valle conducted the first investigation that tested students' needs for mobility in an experimental design.

An initial screening of 417 New York seventh graders with the LSI (Dunn, Dunn & Price, 1979) resulted in identification of 217 — more than half the total population! — with a preference for mobility and 89 with a preference for passivity. The remaining 111 believed that they were not affected by mobility needs; whether or not they needed mobility depended upon their interest or motivation. Twenty youngsters at each end of the mobility spectrum were chosen to participate in the investigation. Word-pair recognition tasks were developed for both the passive and the mobile environments, and all students were taught and tested in both conditions using a 2x2 repeated measures design.

The resultant data verified that: (a) students with either preference performed equally as well when matched, corroborating that both mobility and passivity are strengths when they are responded to positively; (b) no differences were evidenced between the scores of students in the two extremely different environments, substantiating that no single environment--one that permits movement or one that requires students to sit still--generates greater achievement; and (c) significantly lower differences were yielded when students' environments were mismatched with their learning style preferences. Analysis of the relationships among the need to move while learning, the environment in which instruction occurs, and the effect of both on word-pair recognition scores revealed that when students were placed into settings congruent with their diagnosed preferences, achievement scores increased beyond the statistically significant .001 level (Della Valle, 1984).

Although actively and passively preferenced students perfromed equally well in the passive environment, those with a preference for Mobility obtained the highest scores of all groups when they were taught in conditions that permitted movement while learning. Those findings suggest that such students may never have performed to their maximum potential in conventional classes. Conversely, those who preferred a passive environment performed relatively poorly when required to engage in activity while learning, verifying that: (a) an Open Classroom cannot be effective for passive preferents and (b) each school should provide at least two different environments if

both types of students are to achieve as well as they are able academically.

Mobility as a Learning Style Characteristic

> ... during the first years, the right hemisphere is the dominant hemisphere and directs the early learning of the child. As movement patterns are established and increasing kinesthetic, tactile, taste, smell, visual, and nonverbal information is learned, then left hemisphere function comes into play to name, categorize, label, and organize experience into an abstraction . . . This explains why experiential based curriculum programs make more sense for younger children. (Fadely & Hosler, 1983, p. 12)

Few would challenge those authors' description of perceptual development; widespread verification for that sequence exits (Dunn & Carbo, 1982; Dunn & Dunn, 1978; Keefe, 1979). Many educators who are willing to provide activity-oriented experiences for young children however, would be likely to insist that those are not necessary - perhaps not even worthwhile - for secondary youngsters. Della Valle's data, specifically concerned with junior high school students' need for Mobility while learning, evidenced that the reverse was true for a large segment of young adults (1984).

The experiences of teachers throughout the country verify that need for mobility is evidenced among underachievers on a daily basis. The review of the literature suggests that, for years, educators may have been misinterpreting mobility needs; indeed, conventional instructional environments may have been affecting selected students' achievement scores deleteriously. The outcomes of Della Valle's investigation corroborate that youngsters inneed of Mobility tend to

perform better when permitted to learn actively and that both passivity and mobility preferents achieve better in congruent conditions. Certainly Mobility has been verified as a viable learning style characteristic.

References

Anderson, R. P. The assessment and modification of hyperkinesis: A review of programmatic research at Texas Tech University. Montreal, Canada: A paper presented at the International Scientific Conference, 1976. (ERIC Document Reproduction Service No. Ed 135 127.)

Bawkin, H., & Bawkin, R. M. Clinical management of behavioral disorders in children. Philadelphia: Saunders, 1966.

Clark, L. Trends in student behavior. NASSP Bulletin, 1974, 58(2), 27-28.

Clarkson, F. E., & Hayden, B. S. The relationship of family background factors and neurological status to hyperactivity in a normal class setting. Honolulu: Paper presented at the Annual Convention of the American Psychological Association, 1972. (ERIC Document Reproduction Service No. ED 071 212.)

Curtis, P., & Smith, R. A child's exploration of space. In T. C. David & B. D. Wright (Eds.), Learning Environments. Chicago: University of Chicago Press, 1975.

Conlon, M. J. Beating colds with exercise. Newsday, November 2, 1981, Part II, pp. 8-9.

Della Valle, J. An experimental investigation of the relationship(s) between preference for mobility and the word recognition scores of seventh grade students to provide supervisory and administrative guidelines for the organization of effective instructional environments. Unpublished doctoral dissertation, St. John's University, 1984.

Dunn, R., & Carbo, M. Modalities: An open letter to Walter Barbe, Michael Milone, and Raymond Swassing. Educational Leadership, 1981, 38(5), 381-382.

Dunn, R., & Dunn, K. Practical approaches to individualizing instruction. West Nyack, N.Y.: Parker Publishing Company, 1972.

Dunn, R., & Dunn, K. Educator's self-teaching guide to individualizing instructional programs. West Nyack, N.Y.: Parker Publishing Company, 1975.

Dunn, R., & Dunn, K. How to raise independent and professionally successful daughters. Englewood Cliffs, N.J.: Prentice Hall, 1977.

Dunn, R., & Dunn, K. Teaching students through their individual learning styles: A practical approach. Reston, Va.: Reston Publishing Company, 1978.

Dunn, R., Dunn, K., & Price, G. Learning style inventory. Lawrence, Ka.: Price Systems, 1974, 1978, 1979, 1983.

Dunn, R., Dunn, K., & Price, G. Productivity environmental preference survey. Lawrence, Ka.: Price Systems, 1978, 1979, 1981.

Dunn, R., & Shockley, A. Better education through community. New York: Freeport Public Schools. Pursuant to a U.S. Office of Health, Education and Welfare grant, under the supervision of the New York State Education Department, 1970.

Dunn, R., & Shockley, A. That a child may reach: Expanded education in Freeport Public Schools. Pursuant to a U.S. Office of Health, Education and Welfare grant, under the supervision of the New York State Education Department, 1971.

Fadley, J. L., & Hosler, V. N. Understanding the alpha child at home and school. Springfield, Il.: Charles C. Thomas, 1979.

Fadley, J. L., & Hosler, V. N. Case studies in left and right hemispheric functioning. Springfield, Il.: Charles C. Thomas, 1983.

Fitt, S. The individual and his environment. In T. G. David & B. D. Wright (eds.), Learning environments. Chicago: University of Chicago Press, 1975.

Getzels, J. W. Images of the classroom and visions of the learner. In T. G. David & B. D. Wright (eds.), Learning environments. Chicago: Chicago University Press, 1975.

Gjesme, T. Amount of manifested test anxiety in the heterogeneous classroom. Journal of Psychology, 1982, 110(2), 171-189.

Hill, K. T., & Eaton, W. O. The interaction of test anxiety and success-failure experiences in determining children's arithmetic performance. Developmental Psychology, 1977, 13(3), 205-211.

Holt, J. Children are sensitive to space. In T. G. David & B. D. Wright (eds.), Learning environments. Chicago: University of Chicago Press, 1975.

Keefe, J. W. Learning style: An overview. In J. W. Keefe (ed.), Student learning styles: Diagnosing and prescribing programs. Reston, Va.: National Association of Secondary Principals, 1979.

Keefe, J. W. Assessing student learning styles: An overview. Student learning styles and brain behavior. Reston, Va.: National Association of Secondary School Principals, 1982, 43-53.

Kephart, N. C. The slow learner. Columbus, Ohio: Charles E. Merrill Publishing Co., 1971.

King, J., & Marans, R. W. The physical environment and the learning process: A survey of recent research. Michigan: The University of Michigan Press, 1979.

Koester, L. S., & Farley, F. H. Arousal and hyperactivity in open and traditional education. San Francisco, Ca.: Paper presented at the Annual Convention of the American Psychological Association, 1977. (ERIC Document Reproduction Service No. ED 155 543.)

Mandelson, L. R. Test performance on verbal learning task as a function of anxiety-arousing instruction. Journal of Educational Research, 1973, 67(1), 37-40.

Mehrabian, A. Public places and private spaces. New York: Basic Books, Inc., 1976.

Mitchell, D. W., & Crowell, P. J. Modifying inappropriate behavior in an elementary art class. Elementary School Guidance and Counseling, 1973, 8(1), 34-42.

Nixon, S. B. Ways by which overly-active students can be taught to concentrate on study activity. Ca.: Stanford University, 1966. (ERIC Document Reproduction Service No. ED 010 550.)

Omizo, M. M. The effects of relaxation and biofeedback training on dimensions of self-concept among hyperactive male children. Educational Research Quarterly, 1980, 5(1), 22-30.

Omizo, M. M. Relaxation training and biofeedback with hyperactive elementary school children. Elementary School Guidance and Counseling, 1981, 15(4), 329-332.

Phillips, B. N. Dimensions of problem behavior in the elementary school. Chicago: Paper presented at the American Education Research Association, 1968a. (ERIC Document Reproduction Service No. ED 020 558.)

Phillips, B. N. The nature of school anxiety and its relationship to children's school behavior. Psychology in the Schools, 1968b, 5(3), 195-204.

Prochansky, E., & Wolfe, M. The physical setting in open education. In T. G. David & B. B. Wright (eds.). Learning environments. Chicago: Chicago University Press, 1975.

Propst, R. Human needs and working places. In T. G. David & B. D. Wright (eds.) Learning environments. Chicago: University of Chicago Press, 1975.

Reinert, H. One picture is worth a thousand words? Not necessarily! The Modern Language Journal, 1976, 60(4), 160-168.

Restak, R. The brain: The last frontier. Garden City, N. Y.: Doubleday, 1979.

Schmeck, R. R., & Lockhart, D. Introverts and extraverts require different learning environments. Educational Leadership, 1983, 40(5), 54-55.

Severson, H. H. The use of biofeedback and relaxation training by school psychologists. Texas: Paper presented at the Annual Meeting of the National Association of Student Personnel Administrators, 1976. (ERIC Document Reproduction Service No. ED 143 945.)

Sherman, C. F., & Anderson, R. P. Modification of attending behavior in hyperactive children. Psychology in the Schools, 1980, 17(1), 372-379.

Shulman, D. Antidote to restlessness in the preadolescent, School Arts, 1975, 75(2), 22-23.

Sommer, R. Personal space: The behavioral basis of design. Englewood Cliffs, N.J.: Prentice-Hall, 1969.

Sommer, R., & Becker, F. Learning outside the classroom. In T. G. David & B. D. Wright (eds.). Learning environments. Chicago: University of Chicago Press, 1975.

Thies, A. P. A brain-behavior analysis of learning styles. In Student Learning Styles: Diagnosing and Prescribing Programs, 1979, 55-62.

Thies, A. P. The biology of attention. Early Years, 1983, 13(7), 18.

Tingley-Michaelis, C. Make room for movement. Early Years, 1983, 13(6), 26-29, 64-65.

Wine, J. D. Test anxiety and evaluation threat: Children's behavior in the classroom. Journal of Abnormal Psychology, 1979, 7(1), 45-59.